Claims

1. An anti-corrosion formulation comprising an inhibitor pigment dispersed in a carrier characterised in that the inhibitor pigment is an exchangeable anion-bearing hydrotalcite.

2. An anti-corrosion formulation as claimed in claim 1 in which the carrier is a film-forming formulation or binder.

3. An anti-corrosion formulation as claimed in claim 2 in which the film-forming formulation or binder is a polymeric binder.

4. An anti-corrosion formulation as claimed in claim 2 or 3 in which the binder is a polyvinyl butyral (PVB) film or a tall-oil modified polyester solution.

5. An anti-corrosion formulation as claimed in any one of claims 1 to 4 in which the carrier is a primer or paint or can form a lamellar coating.

6. An anti-corrosion formulation as claimed in any one of claims 1 to 5 in which the hydrotalcite is a lamellar mixed hydroxide represented by the general formula $[M^{2+}_{1-x} M^{3+}_{x}(OH)_2]^{x+} [A^{x-}. nH_2O]$, where M2 is a divalent metal, M3 is a trivalent metal and A is an exchangeable anion.

7. An anti-corrosion formulation as claimed in claim 5 or 6 in which M2 is magnesium and M3 is aluminium.

8. An anti-corrosion formulation as claimed in any one of claims 5 to 7 in which the exchangeable anion is an anion with corrosion inhibitor properties.

9. An anti-corrosion formulation as claimed in any one of claims 5 to 8 in which the exchangeable anion is an oxidising agent.

10. An anti-corrosion formulation as claimed in any one of claims 5 to 8 in which the exchangeable anion is a base.

11. An anti-corrosion formulation as claimed in any one of claims 5 to 10 in which the exchangeable anion is capable of becoming strongly adsorbed at metal surfaces and (hydr)oxide covered metal surfaces.

12. An anti-corrosion formulation as claimed in any one of claims 5 to 10 in which the exchangeable anion is capable of forming sparingly soluble precipitates with metal cations.

13. An anti-corrosion formulation as claimed in any one of claims 5 to 12 in which the anion is a transition metal oxyanion, a group (III) oxyanion, a group (IV) oxyanion, a group (V) oxyanion, a group (VI) oxyanion or a group (VII) oxyanion.

14. An anti-corrosion formulation as claimed in claim 13 in which the anion is nitrate (NO_3^-), nitrite (NO_2^-), chromate (CrO_4^{2-}), dichromate ($Cr_2O_7^{2-}$), phosphate (PO_4^{3-}), carbonate (CO_3^{2-}), bicarbonate (HCO_3^-), molybdate (MoO_4^{2-}) or permanganate (MnO_4^{2-}).

15. An anti-corrosion formulation as claimed in any one of claims 5 to 14 in which the formulation is made by a process comprising (i) heating the hydrotalcite clay and (ii) re-hydrating the clay in an aqueous solution containing the anion.

16. An anti-corrosion formulation as claimed in claim 15 in which the hydrotalcite is a magnesium aluminium hydroxy-carbonate powder.

17. An anti-corrosion formulation as claimed in claim 16 in which the hydrotalcite is ($Mg_6Al_2(OH)_{16}CO_3.4H_2O$).

18. An anti-corrosion formulation as claimed in any one of claims 15 to 17 in which the hydrotalcite clay is calcined at a temperature of between 200^0C and 600^0C to produce an amorphous mixture of Al and Mg hydroxides and the amorphous mixture of hydroxides is then cooled to room temperature and rehydrated using an aqueous solution containing the exchangeable anion.

19. A method of treating a metal surface with an anticorrosion pigment which method comprises contacting the surface with a formulation as claimed in any one of claims 1 to 18.

20. An anti-corrosion pigment which comprises an exchangeable anion-bearing hydrotalcite.

21. An anti-corrosion pigment as claimed in claim 20 in which the hydrotalcite is a lamellar mixed hydroxide represented by the general formula $[M^{2+}_{1-x}\ M^{3+}_x(OH)_2]^{x+}$ $[A^{x-}.\ nH_2O]$, where M2 is a divalent metal, M3 is a trivalent metal and A is an exchangeable anion.

22. An anti-corrosion pigment as claimed in claim 20 or 21 in which M2 is magnesium and M3 is aluminium.

23. An anti-corrosion pigment as claimed in any one of claims 20 to 22 in which the exchangeable anion is an anion with corrosion inhibitor properties.

24. An anti-corrosion pigment as claimed in any one of claims 20 to 23 in which the exchangeable anion is an oxidising agent.

25. An anti-corrosion pigment as claimed in any one of claims 20 to 24 in which the exchangeable anion is a base.

26. An anti-corrosion pigment as claimed in any one of claims 20 to 25 in which the exchangeable anion is capable of becoming strongly adsorbed at metal surfaces and (hydr)oxide covered metal surfaces.

27. An anti-corrosion pigment as claimed in any one of claims 20 to 26 in which the exchangeable anion is capable of forming sparingly soluble precipitates with metal cations.

28. An anti-corrosion pigment as claimed in any one of claims 20 to 22 in which the anion is a transition metal oxyanion, a group (III) oxyanion, a group (IV) oxyanion, a group (V) oxyanion, a group (VI) oxyanion or a group (VII) oxyanion.

29. An anti-corrosion pigment as claimed in claim 28 in which the anion is nitrate (NO_3^-), nitrite (NO_2^-), chromate (CrO_4^{2-}), dichromate ($Cr_2O_7^{2-}$), phosphate (PO_4^{3-}), carbonate (CO_3^{2-}), bicarbonate (HCO_3^-), molybdate (MoO_4^{2-}) or permanganate (MnO_4^{2-}).

30. An anti-corrosion pigment as claimed in any one of claims 20 to 29 in which the pigment is made by a process comprising (i) heating the hydrotalcite clay and (ii) re-hydrating the clay in an aqueous solution containing the anion.

31. An anti-corrosion pigment as claimed in claim 30 in which the hydrotalcite is a magnesium aluminium hydroxy-carbonate powder.

32. An anti-corrosion pigment as claimed in claim 31 in which the hydrotalcite is ($Mg_6Al_2(OH)_{16}CO_3.4H_2O$).

33. An anti-corrosion pigment as claimed in any one of claims 30 to 32 in which the hydrotalcite clay is calcined at a temperature of between 200^0C and 600^0C to produce an amorphous mixture of Al and Mg hydroxides and the amorphous mixture of hydroxides then cooled to room temperature and rehydrated using an aqueous solution containing the exchangeable anion.